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ABSTRACT

Seen in its strictest sense, mastery learning is a recent phenomenon. Viewed in terms of its constituent elements, however, it has roots deep in the Western tradition of education. Elements of mastery learning theory can be found in the work of the Sophists; early Jesuit educators; John Amos Comenius, a Moravian pastor; John Locke; Johann Heinrich Pestalozzi; Johann Friedrich Herbart; and the American one-room school. The examples cited are indicative of the ways in which venerable educational traditions have broken ground for mastery learning. However, it is only in today's mastery learning theory that one finds all of the elements combined in this particular manner. (BW)

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Mastery Learning In Historical Perspective

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Introduction

Nowhere is the truism that there is nothing new under the sun more appropriately invoked than in the study of educational change. What seem to be the innovations of any era frequently prove themselves, in fact, to be part of more venerable educational traditions. Thus, all too often, educators find themselves engaged in the task of reinventing the wheel or, perhaps more accurately, inventing a better wheel but going through all the stages of its development in the process.

Mastery learning theory as an educational strategy provides a good illustration of the above mentioned aphorism. Seen in its strictest sense, mastery learning is indeed a recent phenomenon. Pioneered by individuals such as Anderson, Block, Bloom, and Carroll, it has attracted national attention as a result of felt deficiencies in contemporary American education.[1] Indeed, as modified by Adler and other traditional theorists, it has become a rallying point for those who seek a new style of educational reform, and even for some, a panacea.[2] Viewed in terms of its constituent elements, however, mastery learning has venerable roots deep in the Western tradition of education. This essay will, in fact, argue that the component parts of mastery learning strategy occupy the center stage of educational history, at least until the very recent past.

How we view mastery learning is obviously dependent on how we define it. Here, I shall look at mastery learning in terms of two key elements. The first of these is the belief that all can learn well, and master most of what they have been taught. The second, related to the first, is that teachers can instruct in such a fashion that students learn well.[3] From these two assumptions spring a variety of more specific strategies dealing with how this is to be accomplished.

The first of these is predicated on the belief that mastery learning is to be focused on the particular needs and abilities of the individual student. Even

in group instruction, the group does not function as the determinant of the manner of presentation or pace of instruction; rather, the individual student is regarded as unique, and, to a great degree, the learning process is shaped to the individual. In such a program, students are able to progress at their own paces.[4]

The second strategy springs from the understanding of learning as incremental. The learner proceeds from simpler concepts and activities to more complex ones in organized stages. Mastery learning thus demands that a complex task be broken into its constituent elements which are then taught in units of ever-increasing complexity. Only upon successful completion of one unit is another to be attempted.[5]

Finally, the underlying assumptions of mastery learning require that learning be goal-directed. Both at the intermediate and terminal stages, a high level of competency is demanded. This competency, moreover, is determined not by the student's achievements relative to classmates, but by some objective criteria determined in advance.[6] While the educational process is seen as important, it does not become an end in itself; rather, it serves only as a means of producing specified outcomes.

Different mastery learning strategies have additional components, or weight various characteristics differently. Learning for Mastery (LFM), for example, because of its group-based character, is somewhat more oriented toward the whole class than the more individually oriented Personalized System of Instruction (PSI) approach.[7] However, the above elements all seem to be found, in varying patterns and degrees, in the group of teaching-learning strategies labelled "mastery learning."

In viewing the traditional antecedents of mastery learning, one caution is in order. Not all of these elements are to be found in the earlier educational

strategies under discussion here, nor are those which are found articulated in precisely the same fashion as those of the mastery learning theorists. However, individual elements are clearly to be found in various aspects of the Western educational tradition and, taken together, educational history provides virtually all of these elements in one place or another.

The Sophists

An interesting connection can be made between the early Greek educators known as Sophists, and contemporary mastery learning theorists. These individuals, removed from our times by some 2400 years, nonetheless are united to it by several sets of concerns.

The first obvious area of connection is that of education with a particular and highly specific end. In ancient Greece, the spoken word reigned supreme. The Sophists, in the fifth century C.E., discovered that it was possible to develop and teach a specific technique for passing on the lessons of experience in a condensed form: this they called "rhetoric."[8] Beginning with empirical facts, they formulated a body of codified general rules which became the basis for systematic training in public speaking. In both form and content, they developed specific methods for arguing the case on virtually any topic. Sophist instruction included standard rhetorical devices and "set piece" arguments which could be used in a variety of settings.[9] This breaking down of public speaking into its elements anticipates the insistence of mastery learning theorists that successful learning is the result of analyzing the ultimate educational task and breaking it, too, into its constituent elements.

The second area that strikes a resonant cord has to do with the technique used to accomplish this end of a sort of all-purpose eloquence. In Sophistic education, the theoretical part of training was relatively brief. Most of the

learning happened as a result of practice. From the time of Georgias of Leontini onward, this involved the master preparing a model and giving it to his pupils to copy.[10] By imitating the master's work, the most basic level of oratorical training, the student was expected to achieve competence in both content and technique, and go on to compose his own works. As these, in turn, became more complex, the student entered the arena of oratorical apprenticeship.

Even this early, then, we see how mastery is demanded of a student in a relatively simple task, the blind copying of the master's style and content. Only as the student masters the simple task is he allowed to progress to more difficult ones and eventually achieved the stated goal, having become an orator capable of arguing any side of any question, in a fashion which gave attention to both appropriate content and style.[11]

In both of these areas of task analysis and step-by-step instruction, then, the ideas of later theorists are anticipated. Indeed, some Sophists were taken to task precisely because of the character of training which they provided: their oponents felt that they had gone into the business of training oratorical "hired guns," arguing any way which proved convenient. For their own part, the Sophists made not modest claims as to their goal: it was complete mastery. The perfect Sophist was to be able to speak perfectly on everything, requiring a universal competence, a knowledge which extended over every kind of specialized study.[12]

Early Jesuit Education

While the Society of Jesus had not initially been founded as a teaching order, by the end of the 16th century it had nonetheless become deeply involved in the enterprise of schooling. Beginning with a college at Messina in Sicily in 1548, Jesuit education had grown until, in 1615, there were 373 colleges staffed by members of the Society.[13]

Interest in education begins to show itself in the Constitutions written for the new community by its founder, Ignatius Loyola, and published in 1552. The entire fourth part of the Constitutions, a lengthy document, is devoted to education. Here, however, the emphasis is general. The basic rationale for Jesuit education is developed, and concrete rules are made regarding the course of studies and governance of the colleges.[14] Virtually no attention, however, is given to actual pedagogical practice. Since the Constitutions are the fundamental law of the Society, governing many other areas besides education, it is hardly surprising that this is the case.

The lack of a more specific educational manual was one which was felt, however, early in the history of the Society. Indeed, Ignatius himself seems to have indicated in the Constitutions that such a document would be desirable. In 1584, the Jesuits began the process of compiling a manual. Under the leadership of Rudolph Aquaviva, the Society's fifth superior general, a commission of six Jesuits from several regions of western Europe was called to Rome, and for nine months gave themselves to the study of the existing regulations of the colleges, and an examination of the reports flowing from these institutions to Rome. In 1585, they presented a report, which was then disseminated to the entire Society of Jesus, with the instructions that regional commissions were to meet and comment upon it. This first Ratio Studiorum of 1585 was then amended and reissued in 1591. Again the document was submitted to the Society for criticism. Finally, in 1599, after this process of study and revision over 15 years, Aquaviva promulgated the final revision, making it binding upon all Jesuit colleges.[15]

The history of the Ratio Studiorum, then, is unlike that of most educational documents of the period. It is not either a theoretical work, or part of one. Rather, it is a distillation of the practical business of teaching based on the

the experiences of those who were successful pedagogues. Early on, those who directed Jesuit education realized that not all of the Society's teachers would be gifted. The Ratio is an attempt to provide a unified adminstrative structure in the schools and especially, a systematized method of instruction would would allow even the less gifted instructor to be successful.[16] Thus, the Ratio Studiorum is an intensely practical document, borne of experience and directed toward a specific end.

Given the practical character of the Ratio, it is hardly surprising that many of the themes found in mastery learning are also developed here. A glance at the Table of Contents reveals that the structure of learning was seen as hierarchical, with the student building from more simple disciplines to those which were viewed as more complex. In the first grammar class, the student begins with declensions and goes up to the conjugation of ordinary verbs.[17] He proceeds to the next class with its more complete study of syntax and, inthe case of Greek, the study of irregular forms. In the third and last grammar class, syntax is to be completely mastered to prepare the student for the humanities, in which Latin and Greek will be useful languages. In this class, works are studied for their ideas rather than gramatical constructions, and the basic principles of rhetoric are to be seen in a general way.[18] Finally, and only after proceeding through each of these classes, is the student allowed to begin the formal study of rhetoric, with its emphasis on style and eloquence.[19] Beginning with the basic building blocks of language, the student proceeds to ever more difficult tasks, until the final goal of education for eloquence is met.

In each of these stages, moreover, there are specified goals and a high level of learning is demanded before moving on to the next stage. The "Rules for Teachers of teh Lowest Grammar Class," for example, state that "The objective of

this class is a perfect knowledge of rudiments and a beginning knowledge of syntax."[20] In the middle class, the object is the realistic one of "a complete though not exhaustive knowledge of grammar," and in the highest class, "a complete and perfect knowledge of grammar" is the goal.[21]

It the same time, student are allowed, to some degree, to move at their own pace. While there is to be a formal promotion once a year, those who are making superior progress can move ahead at an earlier date:

> If, however, any show superior ability and give promise of making better progress in a higher class than their own (the prefect will know this by examining their records and consulting their teachers), they should not be kept back but may be promoted any time during the year after an examination.[22]

The Ratio, then, provides an approach which anticipates both the positions of the advocates of LFM and PSI systems of instruction.

It is in the educational process itself that strikingly similar techniques to those of mastery learning are seen. There is,for example, a continual emphasis onthe drill which is vital to the learning of language. An alternation of study and review sets the pattern for class activity. The following isthe prescribed schedule for a typical morning in the lowest grammar class:

> In the first hour of the morning there will be recitation from memory of Cicero and of grammar to the decurions. The written work, gathered by the decurions, is corrected by the teacher, who will assign exercises to be done in the meantime . . . In the second hour there is a brief repetition of the prelection on Cicero and, for half an hour, explanation and review of new matter. Lastly, subject matter for a theme is dictated. In the last half hour of the morning, each division has an explanation and repetition of some matter from its own assignment in the first book.[23]

Throughout the day, new material is introduced to the students, and almost immediately reviewed. Written work, a major component of the educational process, is assigned, corrected, and quickly returned to the student. Various games and competitions, too, are used to review material which had previously been taught.[24]

By this continual process of presentation and review, a high level of competency is to be achieved.

Two features of the Jesuit pedagogical arrangement which have specific correlatives in mastery learning are worthy of mention. The first of these is the presence of the "decurions." Because of the rapid growth of the early Jesuit schools, classes were often crowded, with more than 100 students under the direction of a single teacher. To aid the instructor, students of more obvious competence were appointed captains over ten of their peers.[25] Among their duties were hearing the memory lessons of their fellows, collecting compositions, and performing other tasks assigned by the teacher.[26] These students were rotated through the position at two month intervals, presumably to prevent any from becoming too powerful.

The presence of the decurions allowed the teacher greater flexibility, and provided time for him to correct compositions during the class. The decurion, in fact, was used for the same tasks articulated by Keller in his summary of the essential features of PSI, as one who "permits repeated testing, immediate scoring, almost unavoidable tutoring, and a marked enhancement of the personal-social aspect of the educational process."[27]

Another feature prescribed by the Ratio which has echoes in mastery learning is the use of the technique called prelecting, the aim of which is to help the teacher prepare the students for out-of-class assignments. The instructor would first read the Latin or Greek assignment out loud, then link its content with that of the previous lesson, commenting if necessary on vocabulary, structure, and any special points of interest. As the student advanced to the higher classes, there would frequently be a question and answer dialog between students and teacher about the new material. As the students became more competent, they would take on more of the responsibility for commenting on the texts, and the emphasis would

shift from grammar and syntax to ideas and expression. This process, which was to take no more than about 15 minutes of the class, prepared the student to approach the material on his own.[28] By digesting the lesson in small pieces under the guidance of the teacher, the pupils was able to study at home in what amounted to a repetition of the work done in class.

In many respects, then, the Jesuit education codified in the Ratio Studiorum of 1599 anticipates the tenets of mastery learning. Progressing from simple tasks to more complex ones, the student is required to achieve a high level of competence at each level. By means of prelection, repetition, and the use of proctors, new material is gradually introduced while old material is mastered. Superior students can progress through the curriculum more quickly, but all are expected to suceed. Goals are clearly defined at every level. Parenthetically, I might note that admission to the colleges seems not to have been on the basis of academic ability, but of social class and potential for leadership. Thus, it was not simply talented students who were expected tomaster the demanding curriculum; rather a wide variety of individuals, proceeding at somewhat differing paces, were to wend their way through the various classes, and end as eloquent humanists.

John Amos Comenius

In a more theoretical vein, the writings of the Moravian pastor John Amos Comenisu (1592-1670) also contain ideas found later in mastery learning theory. Central to his thinking was the idea of the unity of all human experience. For him, the perceptual world was the basis of all reality: the task of education was to help the observer come to understand the intrinisic order of reality.[29] This, however, had to be accomplished by a study of the principles of human development, and of the ways in which individuals learn.

These principles are clearly articulated in Comenius' great work, the Magna

Didactica of 1630. Here, he attempts to define the principles of successful education, looking to nature for his data. Several of his conclusions find later expression in mastery learning. Using the example of a bird hatching from an egg, he points out how things gradually take form from the inside out, and develop in a stage-by-stage fashion.[30] The process of growth continues to its conclusion, with nature taking care that nothing happen to produce obstacles. He also points out that such principles apply to human activity, both in the sphere of builders and gardiners, and also of educators. Thus, in pointing out how things take shape from within, he criticizes teachers who require that students learn things by rote without any understanding of the basic elements of their lessons.[31]

There are many concrete applications of these theories which Comenius proposes as solutions to educational problems. The process of education, he insists, will be easy if the mind is prepared to receive learning, if the teacher proceeds from the general to the particular, and the easy to the difficult, and if progress is slow and steady.[32] Latin, for example, ought to be taught not simply by explaining the text in Latin, but by providing a parallel translation in the language which the student speaks. The students should begin to exercise their senses, then their memories, and finally, comprehension and judgment.[33] By such progress through stages, the individual can gradually achieve mastery of fairly complex learning.

These applications are given specific form in another of Comenius' major contributions, his textbooks. The first of these, Janua Linguarum Resarata, was a manual for teaching Latin at the secondary level. Here, Comenius uses the form of an encyclopedia of some 98 topics to introduce 100 sections containing 1000 Latin sentences using about 8000 of the most common Latin words. At the beginning of the book, the sentences are short, but become more complex and involved

by the end of the book.[34] By repeating the material, the student was expected to gain mastery of the basics of the language, and progress to the next stage of development. The book proved to be amazingly popular, was eventually translated into 12 European languages, and even appeared in Arabic, Turkish, Mongolian and Persian editions.[35]

The Janua, however, proved to be too difficult for students at the basic level and so, in 1633, Comenius composed the Vestibulum as an introduction. Also encyclopedic, it consisted of 427 simple sentences. The book was to be read twice and the sentences committed to memory by the scholar who was to repeat them to the master. Each sentence was to be translated for the student before he read it, to aid his understanding. In the process of completing the book, the student was expected to learn the declensions of nouns and adjectives and some simple verbs.[36] Like the Janua, this book too met with considerable success.

Both in theory and in practice, then, Comenius anticipated some of the pedagogical strategies of the mastery learners. Like contemporary mastery learning theorists, he emphasized that close study must be made of the learning process in order to determine successful modes of instruction. His insistence on beginning with the simplest elements and moving to the more complex in graduated stages also fits with basic mastery learning precepts. The practice which Comenius proposes in his textbooks gives visible shape to these theories. The student begins with simple Latin constructions, masters them, and moves on to more complex ones. By repetition and drill, the student comes to a high level of competence. While more theoretically based than the traditions of the Ratio Studiorum, and more explicitly grounded in psychology, the writings of Comenius nonetheless show clear parallels to later mastery learning literature.

John Locke

While Comenius was, for the most part, interested in theology and education, other theorists approached schooling from a more philosophical standpoint. Of the seventeenth century rationalists, none was more prominent than John Locke (1632-1704). While his primary interest was in political philosophy, he nonetheless applied himself to the task of formulating a basic view of the educational process. Rejecting the philosophical notion of innate ideas, Locke insisted, as Aristotle had before him, that the mind of a child was blank at birth. Thus, all knowledge came through the senses. While Locke viewed the ultimate aim of education as the cultivation of virtue and character (understandable in light of his social class), he also insisted that there was a need for cognitive attainment. Although he was much less explicit than Comenius in formulating a theory of mental development, he does acknowledge that learning follows certain definite patterns.[37]

Denying as he did original sin, Locke saw human faculties as capable of almost anything. Like the mastery learning theorists, he believed that excellence was possible, and that it was the fruit of practice. Perseverence would end in success.[38] In his work, Some Thoughts Concerning Education, written in 1693, he indicates a gradual procession in the learning process. The child who first begins to read ought to be given Aesop's Fables or some other entertainiing matter, and only then be gradually introduced to the formal study of grammar.[39] Similarly, the study of the globe, and mastery of geography, is the preparatory stage for the study of mathematics:

> These things [world geography], that he will thus learn by sight, and have by rote in his Memory, is not all, I confess, that he is to learn upon Globes. But yet it is a good step and preparation to it, and will make the remainder much easier, when his Judgment is grown ripe enough for it: Besides, that it gets so much time now; and by the pleasure of knowing things, leads him on insensibly to the gaining of Languages.

> When he has the natural Parts of the Globe well fix'd in his Memory, it may then be time to begin Arithmetick.[40]

Learning in one area serves as a preparation for more complex activity, provided the former is well mastered.

This step-by-step approach to education is spelled out in more detail in the Conduct of the Understanding, published in 1706. Just as the painter, dancer, or fencer learns by gradual exercise of skills and eventually becomes adept at complex tasks, so does the scholar learn.[41] Thus, for people as for beasts of burden, it is better that slow progress be made than that nothing be accomplished at all.[42] As Locke insists:

> Things that in a remote and confused view seem very obscure must be approached by gentle and regular steps, and what is most visible, easy and obvious in them considered first . . . The surest way for a learner in this as in all other cases is not to advance by jumps and large strides; let that which he sets himself to learn next be indeed the next, i.e., as nearly conjointed with what he knows already as is possible; let it be distinct but not remote from it; let it be new and what he did not know before, that the understanding may advance; but let it be as little as at once as may be, that its advantages may be clear and sure . . . And though this perhaps may seem a very slow and lingering way to knowledge, yet I dare confidently affirm that whoever will try it in himself or anyone he will teach shall find the advances greater in this method than they would in the same space of time have been in any other he could have taken.[43]

It is most of all in this learning by orderly stages that Locke anticipates the orderly progression of incremental units of material propounded by the exponents of mastery learning.

Johann Heinrich Pestalozzi

The sense empiricism of Locke moved him in the direction of an educational process which has a clear relationship to mastery learning. There were also others who held different epistemologies, but developed educational strategies which would provide the ground for contemporary mastery learning theorists. Pestalozzi,

whose life spanned the period from 1746 to 1827, was among the most prominent of these. Unlike Locke, he was a pedagogue as well as educational theorist: as a consequence, while his ideas are less philosophically well organized, they find expression in concrete methods of instruction.

Unlike Locke, Pestalozzi was influenced by the romantic world view of Rousseau. Reality was to be seen as a whole, and all experience was part of an ecology which had to be penetrated.[44] Thus, education is not simply the result of sensation as Locke would have us believe. Because nature is holistic, it can be understood only by the profound process of intuitive observation (Anschauung).[45] Education is to be geared toward producing and heightening this sort of observation as the child gradually develops.

With romantic optimism, Pestalozzi insists that all children are able to learn. However, great attention must be paid to the proper sequencing of learning activities to bring the child from simpler tasks to those which are more complex. In How Gertrude Teaches Her Children (1802), written during the time at which he directed his school at Burgdorf, Pestalozzi details this more fully. Referring to themanner in which his disciple Krüsi came to accept his ideas, he comments:

> As he learnt more, and saw deeper into the spirit of the method of reducing all branches of knowledge to the first beginning-points, and gradual joining on of a little additional to the first step, in every branch, and found that the consequence of that is a steady progress to new and further additions, he became daily more ready to work with me in the spirit of these principles. . .[46]

In the process of achieving Anschauung, sensory observations are important. However, it is absolutely necessary that these be clear, and that they be mastered before more complex connections are made. The ideal is to make every new idea "only a small, almost imperceptible, addition to that which has been known before, deeply impressed and not to be forgotten."[47]

The concrete application of these ideas is seen most clearly in the manner which Pestalozzi proposes for language instruction. To each vowel, the teacher is to add the consonants, one by one, in sequential order (ab, ac, ad, etc.). When these have been learned, they are to be prefixed with those syllables to which they are frequently connected in words. The child is shown the vowels, written in red on cards, and then is asked to pronounce the consonants along with them. In this fashion, the child is to learn the basics of pronunciation.[48] Spelling is handled in much the same way, since all syllables involve only the addition of consonants to vowel sounds. The cards with vowels are now laid on a board, and consonants are joined to them in increasing numbers. Each syllable, one by one, is to be pronounced by the teacher and repeated by the children "until they cannot forget it."[49] The same is done with all syllables until these are learned by heart.

Once this level of competence has been achieved, the pupil can move on to new things. The letters of a word can be put on the board one by one, and each pronounced alone and with the rest, until the word is completely formed. This can then be done backwards, as the teacher removes letters one by one. Finally, the chidlren ought to be able to spell the word by heart.[50] When all of these spelling and pronunciation exercises are completed, the student should be able to begin the task of reading. In fact, the copybook in which all of these drills have been kept becomes the pupil's first reader.[51]

A number of strategies for mastery learning, then, can be noted in Pestalozzi's theory and practice. Most prominent is the insistence, over and over again, on the need to break learning down into simple units, and proceed from them to the more complex. By the process of repetition and drill, the pupil is expected to achieve a high level of mastery before the next, more complex task is

attempted. Underlying all of these ideas is the optimistic belief that all children can learn.

Johann Friedrich Herbart

A similar but more defined approach to education is found in the works of the theorist Johann Friedrich Herbart (1776-1841). A disciple of Pestalozzi, Herbart was also influenced by Kant and Rousseau, although his ideas developed as a reaction to them. In viewing the work of Pestalozzi, he began to see its inadequacies, and ended up spending most of his life putting the notion of Anschauung on a firmer theoretical basis.[52] For Herbart, the external world consisted of matter and form which were the ultimate particles of reality. These were to be analyzed by the contemplative method of Anschauung. Experiences of ultimate reality, referred to as presentations, come together in the structure of the mind. Consciousness is sustained in a complex of perceptive awareness, called the apperceptive mass. For learning, which is the bonding of new presentations with old structures, to take place, previous experiences must be summoned to consciousness and links established with those concepts already present.[53] Teaching is the process by which another intervenes to sharpen the child's ideas so that they can be properly organized. After clarity has been achieved, the teacher is to help the child associate the given ideas with others, widen their scope, and summarize all the learnings in a broad principle which will then serve as the introduction to the next lesson.[54]

In his final work, Outlines of Educational Doctrine (1835), these theories are propounded in great detail. He begins the work with an affirmation of that upon which mastery learning proponents insist, the ability of all to learn. For Herbart, "The plasticity, or educability, of the pupil is the fundamental postulate of pedagogics."[55] Since nature does not teach systematically, analysis helps ex-

perience to become more instructive.[56] While schools exist to make children more alike in their knowledge, care must be taken that instruction act not upon some abstract body of ideas, but upon the "particular stock of ideas of each pupil taken individually."[57] In teaching, repetition serves a key function in bringing the student's grasp of material to a level of mastery:

> Let us assume that the teacher's presentation has been an adequate one . . . He himself might now repeat; but asks his pupils to do so, lest their thoughts begin to wander from the subject at hand. He comes to their aid and repeats only when their own attempts have failed. But very often they have retained some things and forgotten others. In this case it becomes his business to reinforce the ideas striving to rise into consciousness, but without disturbing their movement.[58]

The goal in all of this is to make the pupil's train of thought coincide with the presentation given. By such repetition, the material is to be mastered.

Like the proponents of PSI, Herbart emphasizes the importance of written communication. In writing, he insists, the student consolidates ideas. Lest these be erroneous, it is important that correction be quick and accurate. Since the purpose of the exercise is to make the pupil see what can be done without the teacher's assistance, the instructor should only rarely intervene during the actual process. By accurately assessing the student's ability, the teacher ought to be able, according to Herbart, to propose tasks which can be readily completed and will aid in developing the pupil's abilities.[59]

All of these methods are to be used within the context of a step-by-step manner of instruction. Although total mastery (i.e., perfection) is not demanded, a high level of competence is expected:

> The subject matter having been chosen, the treatment must be adjusted to it in such a way as to bring it within reach of the pupils. For the exercises growing out of such treatment, the well-known rule holds in general: the easy before the difficult or, more specifically, that which prepares the way before that which cannot be firmly grasped without preliminary knowledge. To insist,

> however, on perfect mastery in this respect, is often equivalent to scaring away interest. Absolute proficiency in preliminary knowledge is a late achievement, nor is it attained without fatigue. The teacher has to be satisfied if the mastery acquired is such that what is lacking can, without serious delay, be added by him in practice. To make the road so level as to do away entirely with the necessity for the occasional leaps means to provide for the convenience of the teacher than for that of the pupils. The young love to climb and jump; they do not take kindly to an absolutely level path. But they are afraid in the dark.[60]

The level of lessons, then, is to be graduated in such a way as insures that there is always challenge in moving to the next highest level, but without such sharp differences that the student is unlikely to make a smooth transition.

In several respects, Herbart anticipates both the general theory and practice of mastery learning. Pedagogical techniques such as repetition and copious written work are viewed as important in providing for competence in a subject. Attention is to be paid to the individual student, and the manner best fitted to abilities. There is a central affirmation that all can learn, together with an insistence on the necessity of breaking instruction into components which are attainable by the student.

The American One Room School

With the exception of the Jesuit Ratio Studiorum of 1599, the discussion this far has centered on pedagogical theory which eventually found practical application, at least in most instances. There have been, however, situations in which educational practice produced pedagogical arrangements quite independently of educational theory. In at least one of these, the development of the American one room school, what emerged was a system of instruction which resembled that proposed by mastery learning.

In many respects, the history of American education is the saga of the one room school. The fact that some 200,000 of these schools existed as late as 1916

is testimony to their pervasive presence on the American educational landscape.[61] The very existence of the one room school is an indication of a central tenet of nineteenth century American educational belief which would be taken in a different direction by the mastery learners. The principal reason for founding the numerous schools which dotted the American countryside in rural areas and small towns down to our own time was that a republican system of government demanded a citizenry capable of governing wisely. Every citizen, or at least, every white Anglo-Saxon Protestant, was seen as educable. It was because of this belief in the ability of all Americans that attention was paid to education, even in the country's backwaters.

Of necessity, the one room school was ungraded. Typically, forty or fifty students would be gathered under the direction of a single teacher. Ages would range from three or four years to the middle teens.[62] Teaching was done to small groups of children, or individually, with memorization and recitation among the most utilized educational tools.[63] Frequently, children were classified on the basis of the reader with which they were most comfortable.[64] The educational arrangement was thus informal and flexible.

Because of the ungraded character of the schools, the students proceeded step-by-step through the curriculum, either in groups or individually. Younger students were, to some degree, prepared for higher studies by listening to the recitations of the older children. Of more importance, however, was the power of the teacher to classify students as she wished and to arrange them so that they were reciting in most subjects with those at their own educational level, irrespective of age. The example of a school in the rural midwest was typical:

> In the Ise School in Kansas in the spring of 1889 the ages of the students in the intermediate B class, arranged largely according to their academic ability, ran all the way from nine

> to fifteen. But in that class were three students, aged ten, twelve, and thirteen, who were reading ahead of their class and were reciting in that subject with the more advanced students in the Intermediate A class. And two students in the Intermediate A class were reciting with the next higher class, Grammar B. On the other hand, one ten-year-old boy in the Intermediate B class recited in both arithmetic and geography with the primary class, and the teacher's note to her successor said that he should be "demoted to the Primary Grade." Adjustments were also made for a student in the Grammar B grade. Because the textbook she had been using in grammar had been replaced, she was behind in that one subject and was reciting with the Intermediate A class, which was the next lower grade.[65]

Thus there was an attempt, seen in the detailed recordkeeping of the schools, to assess each student's capabilities and pace instruction accordingly.

A charming account of a contemporary teacher in a one room school in Terlinga, Texas, points out how this educational arrangement favored an approach which, at least in some respects, approximated mastery learning. Here, children were tested on material, particularly spelling, until they achieved nearly complete mastery. Only then were they allowed to progress to the next level of difficulty.[66] An especially dramatic example was provided by the case of a mildly retarded student whom the teacher agreed to accept. Beginning with pictures, the child was able eventually to identify the letters of the alphabet. He was then started on a basic reader, working with the teacher for nearly six months on the first six page story. Finally, in a moment of triumph, the student read the entire story in front the the class without a single mistake. Speaking of this event, which the teacher considered the most moving of his career, he was moved to comment:

> He needed a teacher who would not give up on him before he broke through some of the early barriers facing him. He needed someone who could take him through all of the early steps, over and over; someone who had the time for the painstaking repetition that was absolutely necessary.[67]

To this issue of time might be added the variable of school structure. Such intensive drill was possible because the student could be taught at the same time as

other children were completing their assignments at a different level, with the instructor available to them all. The child was able to progress up through the grades, though at a slower pace, precisely because the loose system of classification allowed such individual pacing to occur.

It is in the more flexible manner of grouping that the one room school most closely resembles the mastery learning situation, particularly that of PSI. Other mastery learning ideas which appear in this educational context are the use of repetition to insure a high level of competence before moving on to the next level, and also the use of student tutors to aid others in the class. The antecedents of mastery learning, then, are not all European: it is to be found in the form of schooling thought of as most typically American.

Conclusion

The examples cited in this essay are indicative of the ways in which venerable educational traditions have broken ground for that style of instruction we classify as mastery learning. Many more could be cited (e.g., Froebel and the kindergarten movement). All of this, however, leaves us with two questions: "why, if mastery learning is so much in the educational mainstream, did it appear to be so new when first proposed," and "what do all of these antecedents have to say to mastery learning today?"

There is no clear answer to the first question. However, taking a hint from the rise and fall of the one room school, some conjecture about possible answers can be made. In the development of both administrative and curricular progressivism, profound shifts took place which changed the direction of American education.

The late nineteenth century, as Callahan and others have documented, was characterized by an increased bureaucratization of schooling.[68] Taking their

cue from the industrial magnates so prominent in American life of the era, the leaders of American public education began to see schooling as an industrial process, and the school as a factory.[69] As that happened, school structures became more formalized, and necessarily rigid. Attention was focused more on the group than on the individual: children moved forward in groups, and progressed with their cohort from one level of instruction to the next. As that occurred, it was inevitable that more individualized modes of instruction would be seen as inefficient, and suppressed. The doctrine of social efficiency which came to rule in the schools helped to sweep away venerable patterns of educational activity.

The problem was also compounded by the extreme elements of another wing of the progressive movement, the curricular progressives. While Dewey himself gave short shrift to some of these followers, there was nonetheless a continual movement toward a view of education which, at times, came to emphasize process over content. One has only to look at such educational goals as "worthy use of leisure" and "worthy home membership," proposed in the 1918 Cardinal Principles of Education, to see that education which emphasized high levels of mastery and specific content for all students was out of fashion. The influence of the curricular progressives, when combined with the directions taken by their administrative counterparts, was enough to erode several thousand years of educational theory and practice aimed toward mastery.

The question of what all of these antecedents have to teach us is somewhat easier to answer. One might argue that mastery learning is passe, since most of its basic principles can be found in other places. On the other hand, one could hold with equal plausibility that it is precisely because mastery learning is part of the educational mainstream that it merits serious attention. The lessons which history teaches lead me to believe that the truth lies somewhere between these two

extremes.

Learning for mastery is both ancient and new. It is part of a venerable tradition of education which emphasizes the acquisition of specified learnings within an individually structured environment. At the same time, however, it is hardly passe. While the elements of mastery learning can be found in educational writing and practice from the earliest times, it is only in mastery learning theory that one finds all of the elements combined in this particular fashion. In this sense, it is something very new, drawing on research and technologies available to no previous generation of theorists or practicioners.

How, then, ought we to evaluate it? In a very moderate fashion, I believe. Because it is relatively new, it deserves to be investigated and used as a powerful educational tool. At the same time, the perennial character of some of its tenets ought to discourage us from making unreasonable claims about its efficacy. If history has anything to teach us, it is that there is rarely anything new under the educational sun: progress comes from combining that which is genuinely new with that which has gone before. Of such an approach, those who set the stage over many generations would, I believe, approve.

NOTES

[1]James H. Block and Robert B. Burns, "Mastery Learning," Review of Research in Education, 4 (1976), pp. 3-49.

[2]Mortimer J. Adler, The Paideia Proposal (New York, 1982).

[3]Block and Burns, p. 4.

[4]Ibid., p. 12.

[5]Ibid.

[6]Ibid.

[7]Ibid., pp. 4-11.

[8]H. I. Marrou, A History of Education in Antiquity (New York, 1964), p. 84.

[9]Ibid., p. 86.

[10]Ibid., pp. 85-86.

[11]Ibid., p. 86.

[12]Ibid., p. 87.

[13]Ed. Edward A. Fitzpatrick, St. Ignatius and the Ratio Studiorum (New York, 1933), p. 26.

[14]Ignatius Loyola, The Constitutions of the Society of Jesus, trans. George E. Ganss (St. Louis, 1970), pp. 171-229.

[15]Fitzpatrick, pp. 27-33.

[16]Trans. Allen P. Farrell, The Jesuit Ratio Studiorum of 1599 (Washington, 1970), note 58, pp. 127-28.

[17]Ibid., p. 91.

[18]Ibid., pp. 84, 88.

[19]Farrell, p. 79.

[20]Ibid., p. 91.

[21]Ibid., pp. 84, 88.

[22]Ibid., p. 51.

[23]Ibid., p. 92.

[24]Ibid., p. 69.

[25]Ibid., note 61, p. 131.

[26]Ibid.

[27]Block and Burns, p. 10.

[28]Farrell, note 58, pp. 127-28.

[29]James Bowen, A History of Western Education, 3 (New York, 1981), p. 85.

[30]John Amos Comenius, The Great Didactic (London, 1923), pp. 119-22.

[31]Ibid., pp. 123-26.

[32]Ibid., p. 127.

[33]Ibid., pp. 133-35.

[34]M. W. Keatinge, The Great Didactic of John Amos Comenius (London, 1921), p. 21.

[35]Ibid., p. 23.

[37]Bowen, 3, p. 176.

[38]See Lee Cronbach's review of Mastery Learning: Theory and Practice, International Review of Education 18 (1972), pp. 250-51.

[39]Ed. John L. Axtell, The Educational Writings of John Locke (Cambridge, 1968), pp. 259-60.

[40]Axtell, p. 289.

[41]Ed. Francis W. Garforth, John Locke's Of the Conduct of the Understanding (New York, 1966), p. 48.

[42]Ibid., pp. 90-91.

[43]Ibid., pp. 111.

[44]Bowen, 3, pp. 219-20.

[45]Ibid., p. 226.

[46]Johann Henrich Pestalozzi, How Gertrude Teaches Her Children (London, 1915), p. 55.

[47]Ibid. p. 78.

[48]Ibid., p. 92.

[49]Ibid., p. 94.

[50]Ibid., pp. 93-94.

[51]Ibid., p. 95.

[52]Bowen, 3, p. 232.

[53]Ibid., pp. 234-38

[54]Ibid., p. 239.

[55]John Frederick Herbart, Outlines of Educational Doctrine (New York, 1901), p. 1.

[56]Ibid., p. 110.

[57]Ibid., p. 112.

[58]Ibid., pp. 119-120.

[59]Ibid., pp. 123-24.

[60]Herbart, pp. 127-28.

[61]David B. Tyack, Turning Points in American Educational History (New York, 1967), p. 470.

[62]Ibid., pp. 156-57.

[63]Wayne E. Fuller, The Old Country School (Chicago, 1982), pp. 11-18.

[64]Ibid., p. 14.

[65]Ibid., p. 195.

[66]Trent Jones and Carlton Stowers, Where the Rainbows Wait (Chicago, 1978), pp. 54-55.

[67]Ibid., pp. 134-36; 137.

[68]See Raymond E. Callahan, Education and the Cult of Efficiency (Chicago, 1962).

[69]David Tyack and Elisabeth Hansot, Managers of Virtue (New York, 1982), esp. pp. 94-180.

[70]A similar point was recently made by the distinguished scholar of American secondary education, Theodore Sizer, in an address to the Loyola University chapter of Phi Delta Kappa, Chicago, Feb. 25, 1984.